



Overview

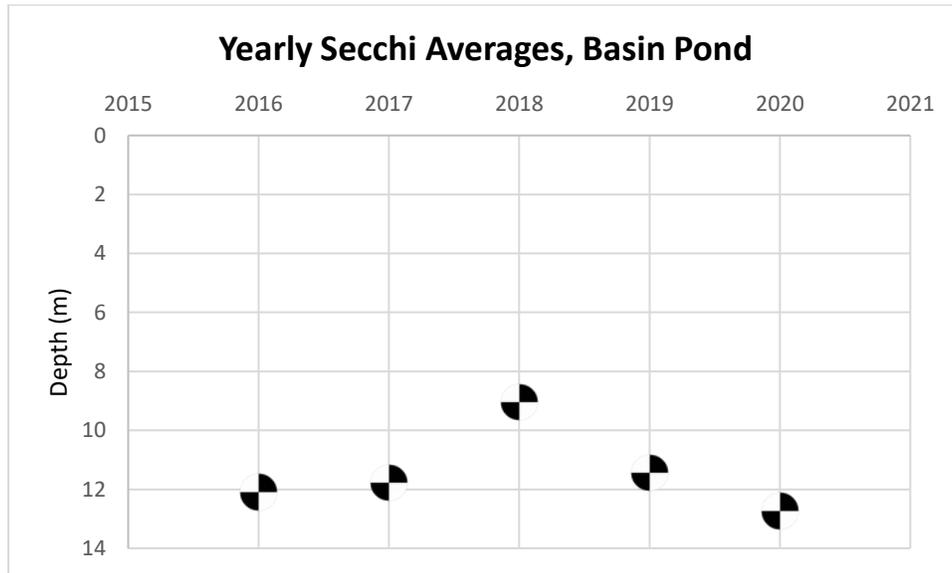
Basin Pond is a 32-acre pond in Fayette, Maine with a mean depth of 42 feet and a maximum depth of 106 feet. In 2020, 30 Mile monitored Basin Pond nearly twice a month from May through September, for a total of 8 visits throughout the summer. On each visit we collected **water clarity** readings and **dissolved oxygen/temperature** profiles. Twice during the late summer, water samples were collected and tested for **phosphorus** concentrations. Sampling visits this summer were performed less frequently than a typical season due to constraints of the COVID-19 pandemic, but the focus remained to keep eyes on the water, collecting the quality data necessary for monitoring water quality trends.

Water Clarity

Secchi disk transparency (SDT) is an indicator of water clarity. A black and white disk is lowered in the water and the reading is taken at the depth at which it is no longer visible. Factors that affect transparency include algal growth, zooplankton, natural water color, and suspended silt or sediment particles.



An area of concern over the last two years has been a dramatic decrease in clarity that occurs over a very short period of time in late August. This drop in clarity was not observed in 2020, but it is still unclear what environmental factors are influencing the pattern. Further monitoring and cooperation with our partners is essential to better understand this unique pond.

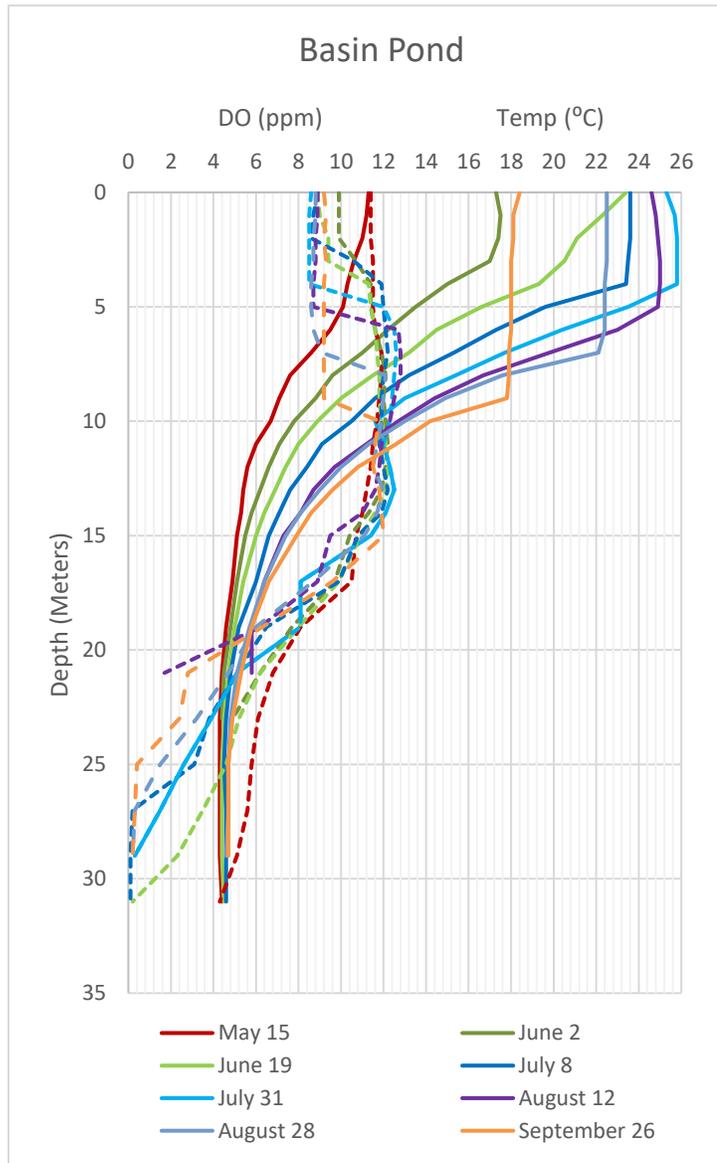


In 2020 the average reading was 12.74 m (41.8 ft), the maximum: 15.34 m (50.3 ft) and the minimum: 11.45 m (37.6 ft). For comparison, Basin’s average Secchi reading in 2019 was 11.4 m. This year’s average is very close to the historical average of 12 meters, which includes limited (sporadic) data dating back to 1999. Basin Pond is the deepest body of water in the 30 Mile River Watershed at 32m deep, and the 15m of clarity observed in June is very impressive.



Dissolved Oxygen

As lake water is warmed during the summer, deep water bodies, such as Basin Pond, form three distinct temperature layers. There is a warm layer at the surface (epilimnion), a thin transitional layer (metalimnion), and a deep cold layer (hypolimnion). The water in the deep layer becomes isolated from surface water during summer stratification which prevents the oxygen supply from being replenished. When oxygen levels are below 2 ppm (parts per million) at the bottom of the lake, it is considered “anoxic” and there is a greater likelihood that iron-bound phosphorus stored in bottom sediments will be released into the lake. In 2020, oxygen levels at the bottom of Basin Pond dropped below 2 ppm in early June and remained anoxic through the duration of our monitoring season into late September.



This is similar to the pattern observed in 2019, but this can also be highly variable from year to year with seasonal temperature differences and weather events. Low oxygen is fairly common at the bottom of ponds that are as deep as Basin Pond is. Continued monitoring over the long term is necessary to identify trends and changes occurring in the pond, and to monitor fluctuations in the area of seasonal anoxia in deep waters

Temperature

The temperature stratification that occurs in Basin Pond is typical of a lake of this depth. The temperature near the bottom of the pond remains remarkably consistent throughout the monitoring season. Our data suggests that Basin Pond becomes stratified as early as May and remains that way through the end of the monitoring season (September). We do not yet have enough information on Basin Pond to form conclusions about long-term trends, and winter-time monitoring will be necessary to establish when and if the water mixes enough that stratification is no longer present.

Phosphorus

Phosphorus is the nutrient that most influences the growth of algae in lakes. Because its natural occurrence in lakes is very small, phosphorus “limits” the growth of algae in lake ecosystems. Small increases in phosphorus in lake water can cause substantial increases in algal growth, hindering lake health as well as the economic, recreational, and aesthetic value of the lake. Tracking in-lake phosphorus levels over time is another way of monitoring changes in lake water quality.

Two samples were collected from Basin Pond this summer and analyzed for Phosphorus. Laboratory results for both samples showed concentrations of phosphorus at 4 ppb (parts per billion). This is consistent with Basin Pond’s historical average of 4.2 ppb. Basin Pond is in good health, and 4 ppb is a sustainable level for maintaining the pristine qualities of this unique pond.

Monitoring of Basin in 2020

2020 was our fifth year of monitoring Basin’s water quality. We began monitoring in late May and continued through the end of September, every two weeks. A big *Thank You* to **Deborah Cayer**, a volunteer water quality monitor, for her support and time monitoring on Parker, David, and Basin Pond this summer. With her help, we were able to maintain more frequent monitoring visits to these ponds and create a more complete picture of the changes that occur throughout the season. The last five years have seen the most frequent water monitoring in Basin Pond’s history in order to provide a greater understanding of the pond’s dynamic processes. This effort will continue to develop a robust dataset that can help our community identify and address water quality concerns in Basin Pond.

Near real-time data for Basin Pond's clarity (secchi depth), dissolved oxygen and temperature can be found online at <http://30mileriver.org/programs/water-quality-monitoring/basin-pond/>, along with a link to historical data.

Need for Sustained, Longer-Term Monitoring

Basin Pond is very fortunate to have good water quality and the lack of development close to the pond greatly reduces the amount of pollutants entering the water. Although stratification is common in Maine's lakes, oxygen levels in Basin Pond should continue to be monitored to identify changes in this natural process.

It is important to note that although there are no red flags yet, we have only five years of complete, consistent data on clarity, dissolved oxygen, temperature, phosphorous and chlorophyll. According to Maine DEP water quality staff, we will need ten years of data at our current monitoring schedule before we will have enough information to identify any trends. Therefore, our **continual and consistent monitoring of Basin Pond is critically important** in order for us to identify negative trends in water quality.

The **annual cost of water quality monitoring of Basin Pond is \$3,500**. This includes staff time, lab fees, travel, and supplies over the six-month monitoring season. While some of the start-up cost for water quality monitoring was funded by foundation grants, the **ongoing cost of water quality monitoring of Basin must be supported by donors to 30 Mile including the Basin-David-Tilton Ponds Association**.